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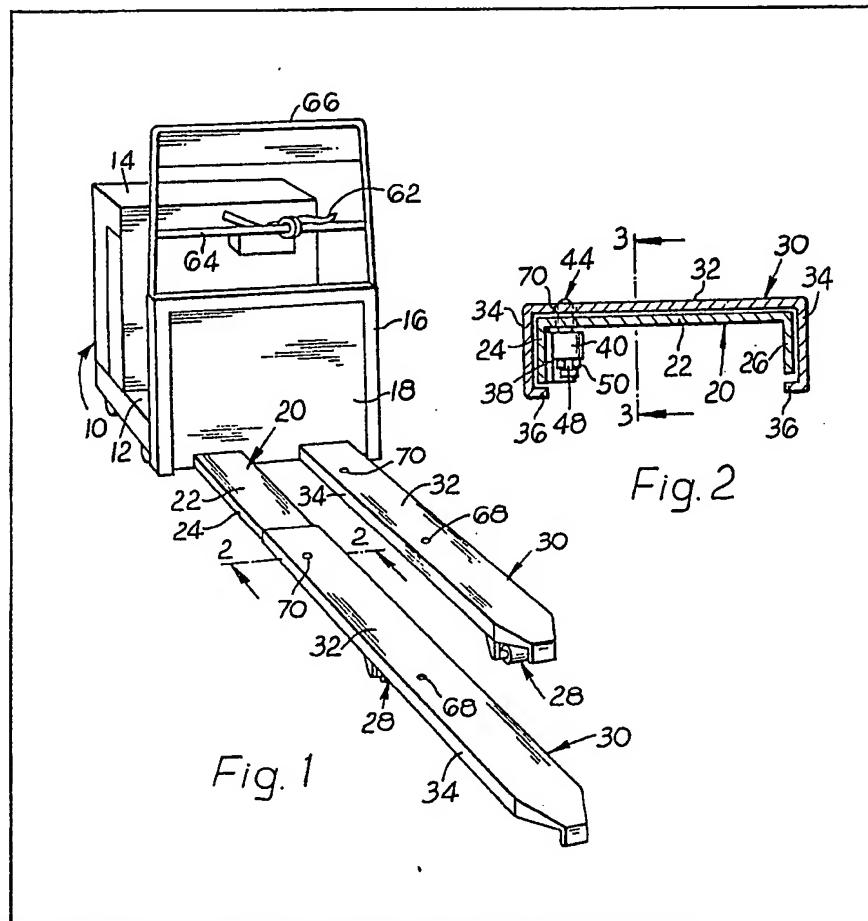
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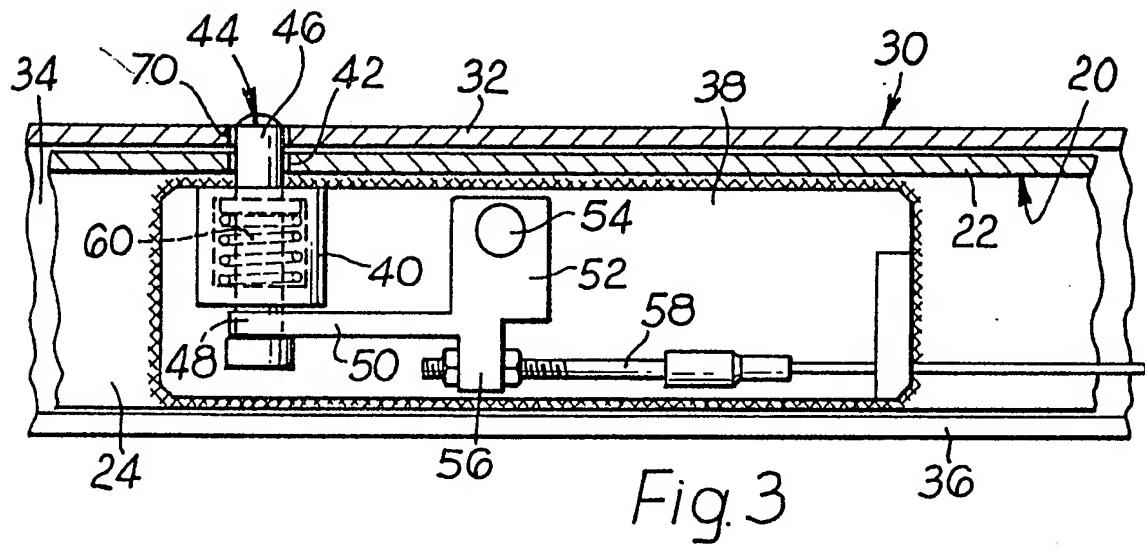
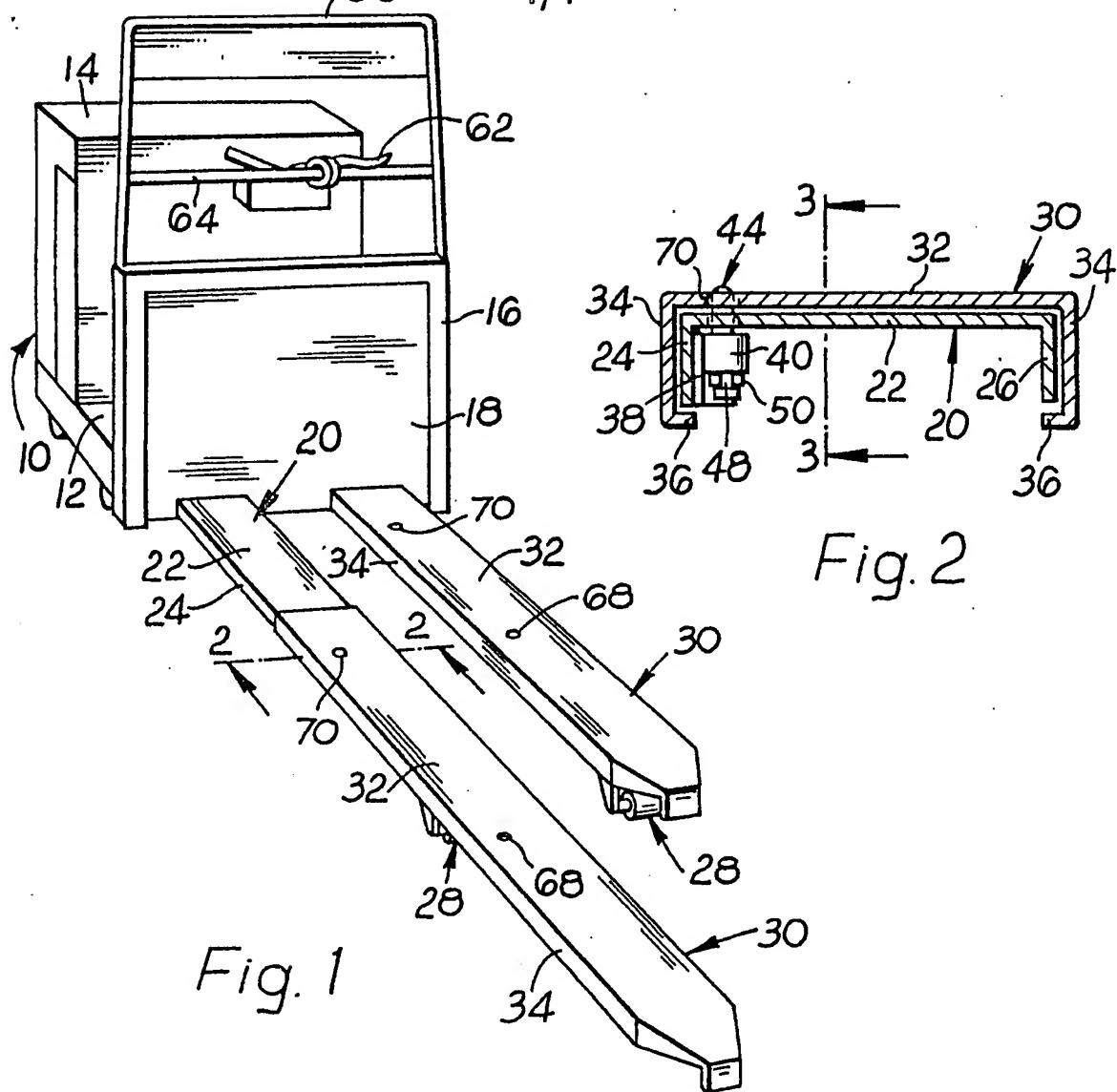
(54) Low-level pallet or stillage mover

(57) To enable the mover to accommodate multiple loads, in front of one another, tines 20 with ground-engaging rollers 28 are provided with extensions 30 whose side flanges 34 have inwardly-directed lips 36 to define channels whereby the extensions 30 are slidable along the tines. A spring-loaded plunger 44 in each tine 20 is engageable in a hole 70 to lock the extension 30 in its extended condition (left hand side of Figure 1) or in hole 68 to lock the extension 30 in its non-extended condition (right hand side of Figure 1), and the plungers 44 can be retracted by means of a lever 62 by way of cables.



The drawing originally filed was informal and the print here reproduced is taken from a later filed formal copy.

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## SPECIFICATION

## Low-level pallet or stillage mover

5 This invention concerns low-level pallet or stillage movers, of the kind comprising a mobile truck on which is mounted a pair of substantially horizontal tines extending forwardly from a vertically-displaceable cross-beam, the latter being raisable to 10 a restricted extent so as to permit the lifting of a load, in the form of a pallet or stillage, carried by the tines, so as to be just clear of the ground for moving it about, wheels or rollers mounted beneath the tines, near the forward or free ends thereof, contributing to 15 supporting the tines.

It is already known, in relation to fork-lift trucks, in which the tines are raisable and lowerable to substantial heights for raising and lowering loads for stacking and/or loading the same, to provide for 20 extending the tines to enable plural loads, e.g. two pallets or two stillages arranged one in front of the other, to be handled simultaneously. In one known arrangement, the tines include hydraulically-extensible extensions. Such an arrangement, of 25 course, involves complicated structure and control equipment on the truck and is relatively expensive. Also known are tubular extensions which can be fitted socket-wise onto the tines. Fitting and removal of these extensions has to be effected manually, but 30 since the extensions are necessarily of stout and robust construction they are heavy. Accordingly, the work of fitting and removal is strenuous and tedious.

An object of the present invention is to provide a pallet or stillage mover in which the above- 35 discussed disadvantages are avoided or minimised, the arrangement permitting tine extension to be achieved in a relatively simple manner not involving strenuous activity.

With this object in view, the present invention 40 provides a pallet or stillage mover of the kind referred to in the introduction hereto characterised in that each of the tines is of a cross-section providing substantially parallel longitudinal sides and has slidably located thereon a respective extension 45 the longitudinal sides of which provide respective channels engaging with and displaceable along the corresponding side of the tine, so as to be slidable between a retracted position and an extended position, locking means being provided to 50 permit the extension to be locked at least in the latter position.

The locking means may be adapted to enable the extensions to be locked in their retracted positions; alternatively or additionally it may serve to enable 55 the extensions to be locked selectively in one of a plurality of different extended positions.

- For ensuring stability of the stillage mover, whilst carrying loads with the extensions in their extended positions, the lengths of the extensions are conveniently approximately equal to the lengths of their tines, the extensions being movable to extend the overall tine and extension length to about 150% of the tine length.

For practical strength, the tines are preferably each 65 of inverted-U-section being fabricated, for example,

of steel, and comprising a planar longitudinal top plate with its parallel longitudinal sides being provided by depending flanges along the underside of each longitudinal edge of the top plate. Then, each

70 extension is conveniently an inverted-U-section metal member (e.g. of steel) with inwardly-directed lips along each limb of the U to define, at the two sides of the member, facing channels which engage the sides of the respective tine.

75 The locking means may comprise any suitable interlocking arrangement acting between each tine and its respective extension for locating the extension in a selected extended position. Preferably said means comprises, for each tine, a plunger carried by 80 the tine and adapted to project therefrom so as to engage into a corresponding hole in the extension. The arrangement may then include a remote control, such as a cable connecting the plunger to a lever, whereby the plungers may be withdrawn, for extending or retracting the extensions from a convenient remote position, e.g. at or near an operating platform of the pallet mover.

Each plunger may be slidably located in a respective boss mounted beneath the top plate of the 90 respective tine, to project upwards through an opening in the said top plate, a bell-crank lever pivotally mounted beneath the top plate engaging the plunger by one arm and being connected to the cable by its other arm, the plunger being spring-loaded to its extension-locking position.

Obviously, other arrangements, e.g. hydraulically-operated or electromagnetically-operated plungers may be employed if desired.

The invention will be described further, by way of 100 example, with reference to the accompanying drawing, in which:-

Figure 1 is a perspective view illustrating a practical embodiment of the low-level pallet or stillage mover constructed in accordance with the 105 invention, this being shown with its tines in the raised disposition, and with one tine extended and the other non-extended;

Figure 2 is a cross-section taken across the extended tine of the pallet or stillage mover of Figure 110 1, this figure corresponding to the line 2-2 of Figure 1, but being to a larger scale than the latter and showing only those parts which are important to the invention; and

Figure 3 is a fragmentary section taken as indicated by the line 3-3 of Figure 2, but to a scale which is enlarged in comparison with Figure 2.

It will be understood that the following description is illustrative and not restrictive of the scope of the invention.

120 The illustrated preferred embodiment of the pallet or stillage mover according to the invention, in its basic construction, is generally similar to known constructions, and comprises a wheeled truck body, indicated generally by the numeral 10, incorporating an operator's platform 12 to one side of which is a housing 14 enclosing batteries, a drive motor and control equipment, with control levers, buttons and the like for operator actuation being disposed outside the housing.

130 To the other side of the platform is a substantially

vertical guide structure 16 in which is located a robust cross-beam 18 which is adapted to be raised and lowered in the guide structure 16, under power derived from the batteries, to a limited extent, of the 5 order of 100 mm. Extending forwardly from the cross-beam 18, that is to say away from the platform 12, are two substantially horizontal tines 20, these being parallel to one another and side-by-side and each being fabricated of robust steel plate, each 10 being composed of a top plate 22 which is parallel-sided (except at its front end, not visible in the drawing, where it tapers to a truncated point) along each longitudinal edge of which is a downwardly-projecting flange 24, 26. This construction ensures 15 that each such tine 20 is particularly strong and will support a substantial weight, e.g. of the order of a ton, with a minimum of deflection. In a typical example, the tines are each about 1600 mm in length, but the lengths can be chosen according to 20 practical requirements. Disposed beneath each tine 20, near to the free end thereof, is a respective roller arrangement indicated generally by the reference numeral 28. These roller arrangements 28 are coupled back to actuating means associated with the 25 cross beam 18 whereby their rollers are maintained in contact with the ground regardless of the raised or lowered condition of the cross beam 18 and tines 20. The mechanism components coupling these roller arrangements 28 back to the actuating means have 30 been omitted from Figures 2 and 3, for the sake of clarity.

Provided on each tine 20 so as to be a longitudinal sliding fit thereon, are respective extensions 30. These are each of length just very slightly greater 35 than length of the tines 20; they are made of folded steel plate, shaped so as to be of inverted-U-section with a main web 32 on which are edge flanges 34 providing the limbs of the U. Each such flange 34 has a respective inwardly-directed lip 36 so that the two 40 sides of the extension 30 define facing channels which locate with the respective sides of the tine 20. Accordingly, the channels, by engaging with the flanges 24, 26 of the tine 20, enable each extension 30 to be slid longitudinally of the respective tine 20. 45 Secured to the side flange 24 of each tine 20 is a respective mounting plate 38 carrying a bearing boss 40 disposed with its axis substantially vertical and registering with a corresponding hole 42 in the top plate 22 of the tine 20. These bosses 40 each 50 accommodate a respective plunger 44 constituting part of a locking arrangement for the respective extension 30. Each such plunger comprises an upper part 46 of cylindrical configuration, with a recessed lower part 48 engaged by a corresponding slot 55 provided by a bifurcated first arm 50 of a bell-crank lever 52 pivotally mounted on the plate 38 by pivot 54. The other arm 56 of the bell crank lever 52 is connected to a respective actuating cable 58, and the plunger 44 is loaded by a spring 60, within the boss 60 40, so as to project upwards from the upper surface of the top plate 22 of the respective tine 20.

The two cables 58 extend along the undersides of the respective tines 20 and connect with an actuating lever 62 which may be retainable by a ratchet, for 65 instance in a manner analogous to a motor-vehicle's

hand-brake lever. The lever 62 is shown as being mounted on a cross bar 64 of a guard frame 66 of the pallet or stillage mover, but it can, of course, be mounted in any suitable disposition.

- 70 Provided in each extension 30 are two holes 68 and 70 into which the respective plungers are relatively snug fits. Of these holes, each hole 68 is disposed in a position such that it will be engaged by the plunger 44 when the extension 30 is in its 75 retracted position substantially wholly overlying the respective tine 20, as is shown for the right hand extension 30 in Figure 1, and the other hole 70 is provided in a position wherein it is engaged by the respective plunger 44 when the extension 30 is in an 80 extended position, that is to say when about half of the length of the extension 30 is projecting forwards past the front end of the respective tine 20 as has been shown for the left hand extension in Figure 1.

The manner of use of the arrangement of the 85 invention will be evident from the foregoing description. When it is desired to use the pallet mover with its tines 20 at normal length, both of the tine extensions 30 are disposed in their fully retracted positions (corresponding to the extension 30 at the 90 right hand side in Figure 1) and are held there by the plungers 44 engaging the respective holes 68. Then the mover can be employed for picking up and shifting single loads, be they pallets or stillages (not shown), in conventional manner.

- 95 If, now, it is desired to convert the mover to enable it to raise and move larger loads (i.e. of greater front-to-rear depth) or multiple pallets or stillages, firstly the extensions 30 are released by actuating the lever 62 to retract the plungers 44. The operator 100 can then simply slide the extensions 30 relative to their tines 20, without having to be involved in the strenuous work of lifting and/or carrying them, until they reach their extended positions (corresponding to the extension 30 at the left hand side of Figure 1), 105 whereupon the lever 62 is released to permit the locking plungers 44 to engage into the corresponding holes 70.

The combined length of the tine 20 and its extension 30 is about 150% of the tine length. 110 Accordingly, in the extended condition, the roller arrangements 28 are disposed about one-third of the way from the end of the respective tine/extension combination, which provides for good stability under load. 115 The structure as described enables quite heavy multiple loads to be raised and moved, without difficulty and the tines 20 and extensions 30 do not suffer any significant deflection in spite of the fact that the thickness of the main webs 32 of the 120 extensions 30 must necessarily be relatively thin (for instance of the order of 4 mm) to avoid the presence of any significant height difference relative to the top plates 22 of the tines 20.

It will be understood that the cross-beam 18 and 125 tines 20 are shown, in Figure 1, in the raised position and that for engaging the tines 20 beneath a load (not shown) they will be lowered (with the cross-beam 18 moving relative to the guide structure 16) in comparison with their illustrated positions.

- 130 The invention is not confined to the precise details

of the foregoing example, and variations may be made thereto. Thus, instead of cable-actuated locking means, the arrangement may incorporate hydraulically-actuated or electromagnetically-actuated locking means, and the extensions 30 may be provided with further holes, between the holes 68 and 70 which permit the extensions to be locked in any selected one of a plurality of different extended conditions. Other modifications are possible.

#### CLAIMS

1. A low-level pallet or stillage mover, of the kind comprising a mobile truck on which is mounted a pair of substantially horizontal tines which extending forwardly from a vertically-displaceable cross-beam, the latter being raisable to a restricted extent so as to permit the lifting of a load, in the form of a pallet or stillage, carried by the tines, so as to be just clear of the ground for moving it about, wheels or rollers mounted beneath the tines, near the forward or free ends thereof, contributing to supporting the tines, characterised in that each of the tines is of a cross-section providing substantially parallel longitudinal sides and has slidably located thereon a respective extension the longitudinal sides of which provide respective channels engaging with and displaceable along the corresponding side of the tine, so as to be slidable between a retracted position and an extended position, locking means being provided to permit the extension to be locked at least in the latter position.

2. A low-level pallet or stillage mover as claimed in claim 1 wherein the locking means is adapted to enable the extensions to be locked in their retracted positions.

3. A low-level pallet or stillage mover as claimed in claim 1 or 2 wherein the locking means serves to enable the extensions to be locked selectively in one of a plurality of different extended positions.

10. A low-level pallet or stillage mover as claimed in claim 1, 2 or 3 wherein the lengths of the extensions are approximately equal to the lengths of their tines, the extensions being movable to extend the overall tine and extension length to about 150% of the tine length.

5. A low-level pallet or stillage mover as claimed in any preceding claim wherein the locking means is adapted to be releasably retained in a disengaged condition to permit sliding of the extensions.

6. A low-level pallet or stillage mover as claimed in any preceding claim wherein the tines are each of inverted-U-section.

7. A low-level pallet or stillage mover as claimed in claim 6 wherein each tine comprises a planar longitudinal top plate with its parallel longitudinal sides provided by depending flanges along the underside of each longitudinal edge of the top plate, each extension being an inverted-U-section metal member with inwardly-directed lips along each limb of the U to define, at the two sides of the member, facing channels which engage the sides of the respective tine.

8. A low-level pallet or stillage mover as claimed in any preceding claim wherein the locking means

comprises, for each tine, a plunger carried by the tine and adapted to project therefrom so as to engage into a corresponding hole in the extension.

9. A low-level pallet or stillage mover as claimed in claim 8 further including a remote control, whereby the plungers may be withdrawn, for extending or retracting the extensions, from a remote position.

10. A low-level pallet or stillage mover as claimed in claim 8 or 9 wherein each plunger is slidably located in a respective boss mounted beneath the top plate of the respective tine, to project upwards through an opening in said top plate, a bell-crank lever pivotally mounted beneath the top plate engaging the plunger by one arm and being connected to a cable by its other arm, the plunger being spring-loaded to its extension-locking position.

11. A low-level pallet or stillage mover substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

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